Observations on Efficiency, Safety, and Security

Jason Makansi, President

Pearl Street Inc
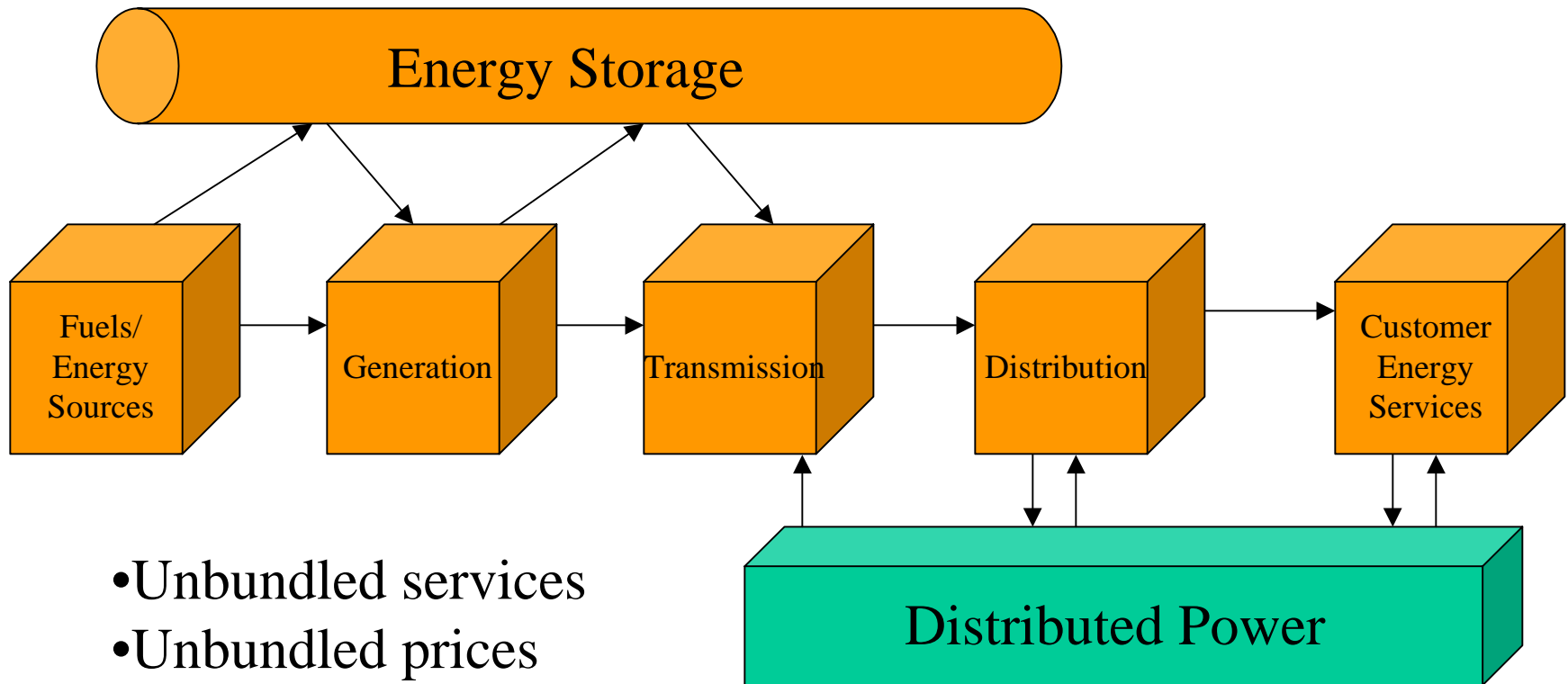
www.pearlstreetinc.com

Infrastructure optimization

- Extracting stealth capacity from the nation's power production facilities
  - Efficiency
  - Capacity factors
  - Higher output
- Getting more productivity from existing infrastructure. Gas delivery, electric generation, transmission lines
  - Technical and organizational integration between gas and electric

Some thoughts on security issues

- Remember Tylenol? Increased packaging clashed with waste reduction goals
- Regulating big vs small (e.g. automobile owners vs power stations for emissions)
- Points of interconnectedness-the six (?) critical electric system substations or interzone control points
- Costs. Who pays and how?
- Public perceptions. Gas pipeline explosions vs nuclear plants
- New technologies. A greater role for energy storage?
- Issues affecting security
  - Competition and transparency
  - Open and shared IT systems
  - Decentralization vs centralization (e.g. distributed power and micro, mini-grids vs central stations and large T lines

Six Dimensions of the "New" Electricity Value Chain

Energy Storage

Fuels/ Energy Sources → Generation → Transmission → Distribution → Customer Energy Services

Distributed Power

•Unbundled services
•Unbundled prices
•New service strategies

A New World Order for Electricity: Role of government

Wholesale market

- Fully deregulated
- Significant hedging/trading
- Energy storage for arbitrage
- Flexible/truly dispatchable power stations (coal, gas)
- New private DC lines
- Conversion to some private AC Transmission
- FLEXIBILITY, COMMODITY MARKET MENTALITY. ARBITRAGE-DRIVEN

Retail market

- Mostly deregulated
- Distributed power, micro-, mini-grids
- Natural-gas drive
- CUSTOMER-DRIVEN SERVICES
- Demand-side and conservation
- Little trading and hedging (except for big-Load customers
- Power quality management

The Electricity Infrastructure BACKBONE

- Mostly regulated or large government role
- Energy storage for ancillary services
- Low cost but inflexible baseload stations (coal, nuclear)

- Fee-for-service
- RELIABILITY AND SECURITY DRIVEN
- Incremental rates of return over costs